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**(54) SOLID SURFACE TREATMENT APPARATUS,
METHOD, PASSIVE STATE FILM FORMING
APPARATUS, METHOD & PROCESS**

(57) Abstract

PURPOSE: To make it possible to remove impurities such as oxide films stuck to the surfaces of various solids without damaging a base material by radiating a gas containing hydrogen activation species to the surface of a solid and removing impurities from solid surfaces.

CONSTITUTION: Valves 7 and 10 are opened, air is exhausted from the inside of hydrogen activation species forming means 1, pipes 4 to 6 and a sample chamber 3, and the hydrogen activation species forming means 1 is heated to about 300 to 450°C by heating means 2. Next, an inert gas containing H₂ gas is applied, hydrogen activation species are generated by the hydrogen activation species forming means 1, and the hydrogen activation species are radiated to the surface of a sample 9. By radiating the hydrogen activation species to the surface of the sample 9 for a predetermined duration, the hydrogen activation species having high reactivity with oxygen react with an oxide film on sample surface, and a reaction product is discharge to gaseous phase and flowed by an air current of gas and the oxide film is removed from the surface of solid. By doing this, the impurities stuck to the surface of solid can be removed without giving no damages to the base material.

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